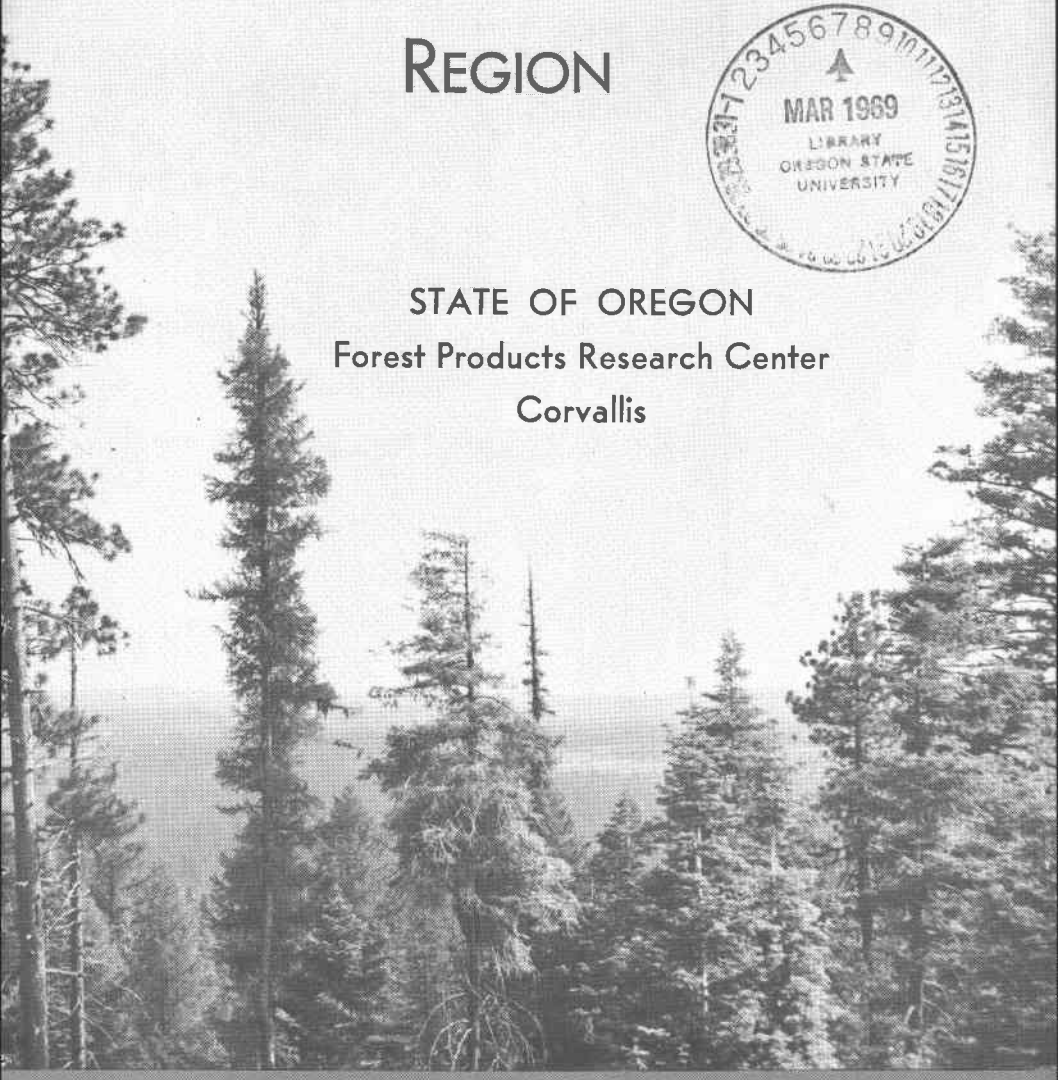
LOG GRADE STUDIES in the *Ponderosa Pine* REGION



STATE OF OREGON
Forest Products Research Center
Corvallis

Lumber Grade Recovery from Douglas Fir, Western Larch, and White Fir at Enterprise, Oregon

BULLETIN 6 . . . . . December 1957

PREFACE

First of a planned series of mill studies to establish log grades for species associated with ponderosa pine, the study reported was made with the cooperation of Mt. Emily Lumber Company, under the direction of a committee representing participating agencies, namely:

Bureau of Indian Affairs

Bureau of Land Management

Forest Products Research Center

Pacific Northwest Forest and Range Experiment Station

United States Forest Service, Region 6

Western Pine Association

Log Grade Studies in the Ponderosa Pine Region

Lumber Grade Recovery From Douglas Fir, Western Larch, and White Fir at Enterprise, Oregon

by

Don Burnet

J. R. Pfeiffer

Need for log grades to indicate potential lumber recovery values from species associated with ponderosa pine increases with rising stumpage prices. Since there were no accepted log grades for associated species within the Ponderosa Pine Region, several agencies concerned with appraisal, sale, or purchase of such timber initiated a cooperative study to establish log grades for three of the most important species--Douglas fir, western larch, and white fir.

It was desired that log grades established be applicable through out the Ponderosa Pine Region. Since timber quality may vary considerably between areas it was planned to make a series of lumber-grade-recovery studies within the Region. The present study is the first made in Oregon.

Although this first Oregon study was comprehensive for timber in the particular area, there was no way to determine applicability of results to timber in other parts of the Region. Results, therefore, should be applied only locally until additional recovery data are available.

Trial log-grade descriptions were written for the three species by representatives of the cooperating agencies, and in August 1954 the first comprehensive mill study was undertaken. This initial study, conducted at the Enterprise mill of the Mt. Emily Lumber Company, had the following specific objectives:

- to obtain lumber-grade-recovery data (dry-surfaced basis) by trial log grades and by log size for Douglas fir, western larch, and white fir from Oregon timber stands in the Ponderosa Pine Region.

- to judge the merits of the trial log grades, and to modify them, if necessary, on the basis of lumber-recovery data obtained.

- to record degrade, by cause, from green chain through kiln drying and surfacing operations--this detail to be made available as a separate report.

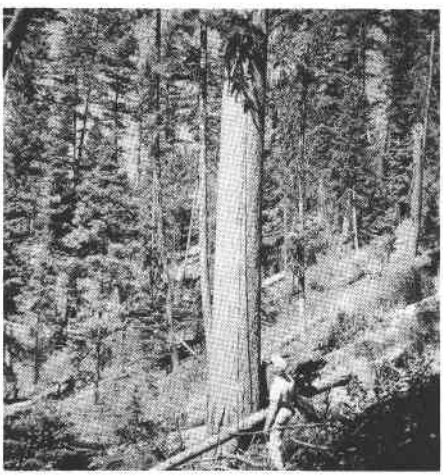
- to establish procedures for this and subsequent mill studies on associated species.

Trial log grades for associated species

Four men from the cooperating agencies were selected to write log-grade descriptions prior to the study. These grades proved fundamentally sound, but were modified slightly following analysis of this study and a subsequent study conducted in 1955. Log-grade data in the present study then were changed to comply with these modifications. Following are descriptions of the modified trial log grades:

GRADE 1:

- Minimum diameter, 18 inches.
- Minimum length, 12 feet.
- Surface-clear area: 12 feet of length in logs shorter than 16 feet, 75 per cent of area in logs 16 feet or longer (3 clear faces, or 12 feet of clear length).
- Exception: 2 pin knots allowed on surface-clear portions.
- Nonclear faces may have any number of knots of any size.



Western larch in Wallowa County, Oregon. First log (left) is entirely surface-clear. Logs 2 and 3 (right) show typical knot clusters.

GRADE 2:

- Minimum diameter, 14 inches
- Minimum length, 12 feet
- Surface characteristics;

  a. Logs 20 inches or more---
  One clear face, and 1 face with live or dead knots and indicators not over 1 inch in diameter.

  b. Logs 16-19 inches---
  Two clear faces with 1 pin knot allowable on 1 of the clear faces.

  c. Logs 14 and 15 inches---
  Three clear faces. No pin knots allowable on the clear faces.

- Nonclear faces may have any number of knots of any size, except as noted.

GRADE 3:

- Minimum diameter, 12 inches
- Minimum length, 12 feet
- Surface characteristics;

  Any number small knots allowable, but only 1 knot larger than 1/6 the log diameter permitted.
  When a knot larger than 1/6 the log diameter occurs in a knot cluster, a decision must be made as to whether scale or grade of the log will be affected. For such logs, the following rules will apply:

  a. Knot clusters or burls not eliminated in the slab require a scaling deduction and shall not be considered in grading logs of associated species (page 19).

  b. Knot clusters not large enough to require a scaling deduction shall be treated as though the large knot in the cluster were a single knot--surrounding adventitious limbs or knots shall be disregarded.

GRADE 4: Any sawlog that is not grade 1, 2, or 3 is grade 4.

Definitions:

A face is 1/4 the log circumference for the full length of the log.

A clear face is one with no knots or knot indicators.

A pin knot is a knot up to 1/2 inch in diameter (page 11).

The sample

The study sample included 117 Douglas fir, 170 western larch, and 95 white fir logs having a total scale of 115,080 feet, gross, and 96,100 board feet, net. Log diameters and log grades were well represented with the following exceptions: No. 1 Douglas fir logs, No. 1 and No. 2 white fir logs, and logs 30 inches or over in diameter of all species. Distribution of study logs in detail is shown in Table 1. Since the log rules did not apply to 18- and 20-foot logs, none of these lengths were included as study logs unless the extra length did not affect the grade of that log.

Note in Table 1 all diameter classes containing less than 4 logs were designated by hyphens. Such logs were not considered in the study to help prevent misleading results because of wide variations in lumber recovery from individual logs.

Typical trees and some log characteristics are shown on pages 2, 9, 18, 19, 23, and 24.

The study mill

The Mt. Emily mill at Enterprise, Oregon, had a band headrig, an edger, and a trimmer on the site. Lumber was loaded directly onto flat cars for rail shipment to the firm's LaGrande mill for seasoning and remanufacturing. Work practice at Enterprise was altered for the study to allow all sawing on the headrig, rather than cutting for the resaw at LaGrande. This plan gave an improved indication of true lumber recovery. All data are presented on a surfaced-dry basis.

STUDY PROCEDURE

Log selection, grading, and marking

To minimize study time, potential study logs were sorted in the pond. Fifty logs well distributed by diameter in each of the four log grades for each species was the goal. Log distribution by diameter class, grade, and species, shown in Table 1, was not a measure of woods-run logs for the area.

Logs were graded on the deck after bucking. Two log graders were present, one each from the U. S. Forest Service and the Western Pine Association. Both graders examined and determined jointly the trial grade for each study log. Chronological numbers were placed on each end of study logs as they were graded. All information concerning size and scale was recorded in a standard scale book. Exterior characteristics of study logs were diagrammed on an appropriate form.

Lumber marking, grading, and tallying

Lumber marking. Identity of all lumber with respective parent logs was effected by a system of colors. All pieces coming from a particular study log were marked with one color of marking crayon. Five colors were applied in succession to insure clearance of each study log through the mill before a color was repeated. Lumber was marked between the headrig and the edger. Tallymen on the green chain identified each piece of lumber with its parent log by the color mark.

Lumber grading and tallying. All study lumber was graded on the green chain by a Western Pine Association grader with Western Pine lumber grades. Every piece was grade-marked. Grading was particularly difficult, as the mill specialized in narrow widths. Narrow lumber often loaded the grading table to such an extent the grader did not have ample time to properly inspect each piece (see page 9). Added to excessive number of pieces was the difficulty in identifying defects in rough-green material.

Common and dimension lumber were tallied by recording the length of each piece in its appropriate thickness-width-grade category on the tally sheet. Selects were tallied in surface feet in the appropriate grade. One tally sheet was allotted to each log.

Table 1. Distribution of Logs by Species, Diameter Class, and Trial Log Grades at Mt. Emily Lumber Company.

Diameter class	Log grade				
	1	2	3	4	All
Douglas fir					
6-11	0	0	0	16	16
12-17	0	--	12	20	32
18-23	--*	9	17	14	40
24-29	0	--	10	15	25
30-35	0	--	4	--	8
	--	9	43	65	117
Western larch					
6-11	0	0	0	10	10
12-17	0	--	12	15	27
18-23	13	14	13	10	50
24-29	12	12	8	11	43
30-35	11	9	8	4	32
over 35	4	--	4	--	8
	40	35	45	50	170
White fir					
6-11	0	0	0	17	17
12-17	0	0	26	15	41
18-23	0	0	29	8	37
24-29	0	0	--	--	--
	0	0	55	40	95
All species	40	44	143	155	382

*Diameter classes with 3 or less logs were not included because of possibility of misleading results.

Lumber drying

All lumber cut during the study was shipped on flat cars to the LaGrande mill for seasoning and machining. It was not possible to retain log identity of the lumber past the green chain. All lumber that had been grade-marked, however, was sorted according to drying items. After drying, all pieces were surfaced, regraded and tallied. Degrade and reasons for it were recorded. This latter portion of the study is contained in a separate report.

Computing procedure, green-chain tally

All computing and summarizing on the green-chain tally were done with automatic computers. Field data first had to be transferred to cards. Three types of cards were required for the study. A "log" card recorded all log statistics, including mill, species, log number, gross and net scale, length, small and large diameter, grade, and sawing time. One such card was required for each log. These data were transferred from the scale book with special metallic-lead pencils.

A "lumber" card contained all lumber data. Several such cards may have been required for a particular log, one for each thickness-width-grade classification of lumber cut from a given log. Data on the card included mill, species, log number, lumber thickness, width, grade, and total lineal feet in that category. For selects, total surface feet were recorded rather than total lineal feet, and the width was made equivalent to one foot. Calculation of footage was then accomplished by multiplying the thickness in quarters times the surface feet. This card, too, was marked with special pencils.

On a third card, data from all cards pertaining to each log were accumulated. Information on this card included duplication of the log card and a summary of all lumber cards, showing grade distribution in fbm (feet, board measure), total fbm cut from the log, overrun, and total value of the log. Final totals and summary work came from this card.

While the computer was processing and summarizing data on a green-chain-tally basis, data collected on seasoning and machining degrade of study lumber were analyzed and summarized. On the basis of percentage changes in grade and losses in footage occurring during seasoning and machining, each rough-green grade was given an adjusted surfaced-dry value. From the adjusted values, the dollar value of lumber from each study log was computed.

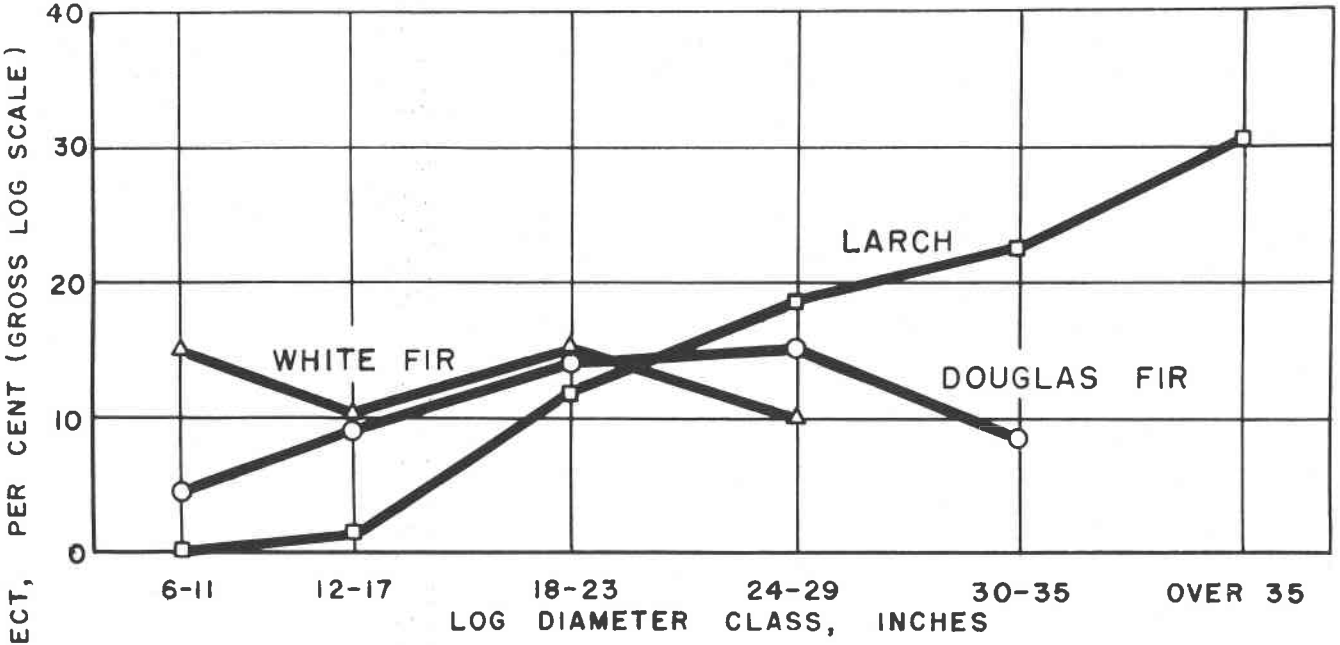


FIGURE 1. DEFECT BY SPECIES FOR LOGS AT ENTERPRISE, OREGON

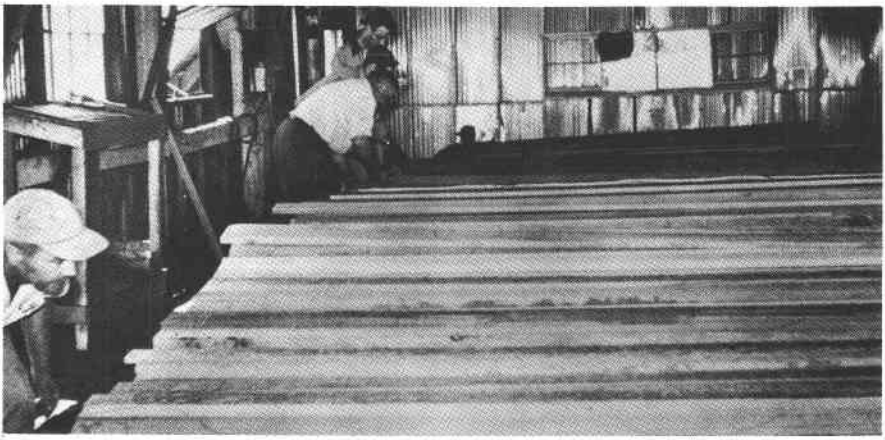
RESULTS

Tables and graphs were prepared to show lumber recovery, overrun, and lumber value from the various log grades and diameters. Values in the tables were not analyzed statistically, but simply were reported as found. The few logs in some grades and diameter classes and the wide variation in individual logs made it evident, however, that accuracy of the simple averages reported likely was much less than is apparent in the tables.

Broad general relationships can be seen in the graphs more easily than in the tables, where values as reported were refined to an accuracy that did not always exist.

Defect by log size

Data in Table 5 permitted calculation of the over-all percentages of defect found in each log grade, but did not reveal how the amount of defect varied with log size. Consequently, Figure 1 was prepared to indicate this relationship. The amount of defect in larch steadily increased with increase in log size. Defect for Douglas fir began to decrease and was similar to white fir in large diameters. The difference between Douglas fir and western larch indicated for logs 30 inches or more in diameter may not be real, however, since it was based on only 4 logs of Douglas fir. Because the data were not analyzed statistically, observed points in Figure 1 simply were connected with straight lines.



Many narrow pieces made grading difficult in the study.

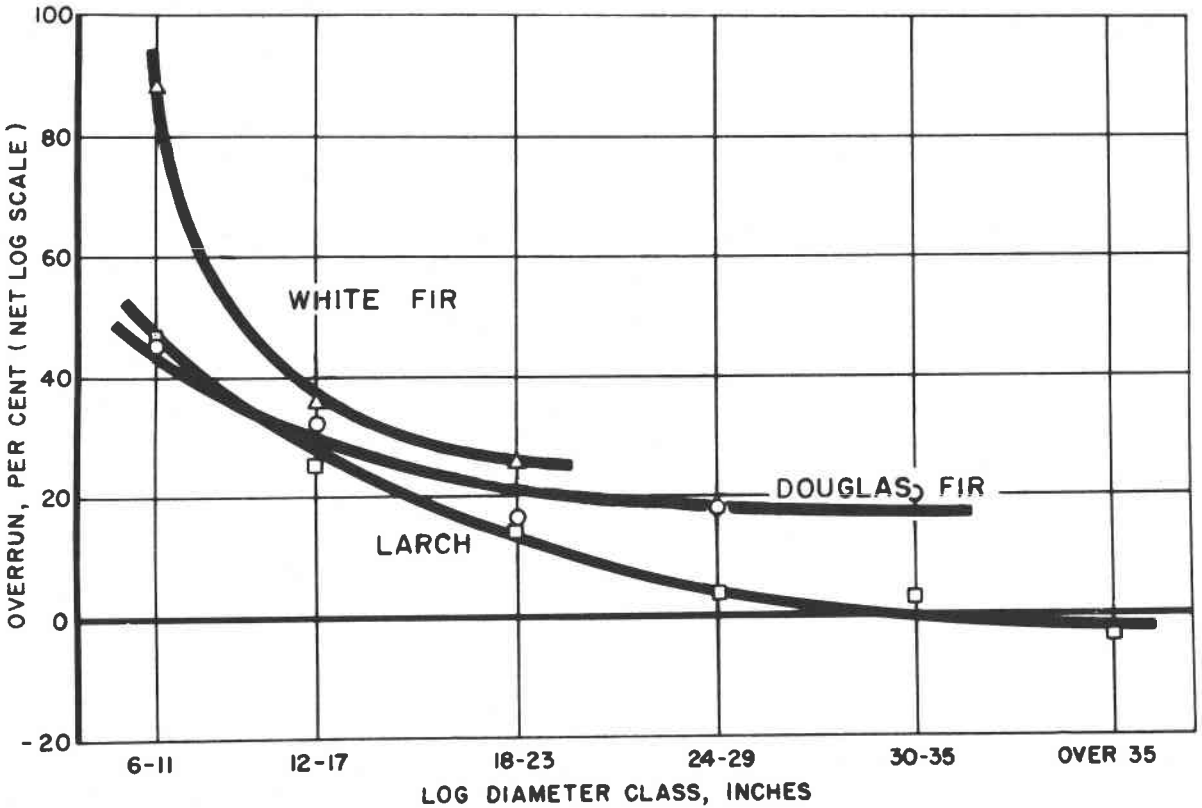


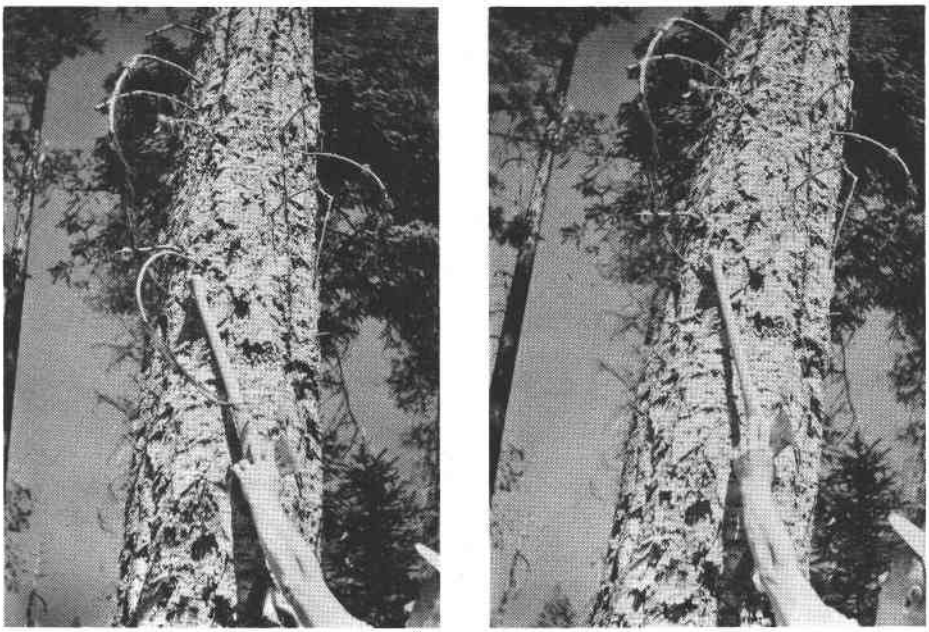
FIGURE 2. OVERRUN BY SPECIES FOR ALL STUDY LOGS AT ENTERPRISE, OREGON

Overrun

Overrun by species and by log grade may be calculated from Table 5, but not revealed is how overrun may vary with log size. The expected decrease in overrun with increase in log diameter is seen in Figure 2, prepared to show the relationship of overrun to log size. Empirical relationships are shown, since curves were fitted easily by eye. Overrun was consistently higher for Douglas fir and white fir than for larch.

Lumber recovery by log grade and diameter class

Distribution of surfaced-dry lumber grades from each log grade and diameter class is shown for each species in Figures 3 to 10, and Tables 2, 3, and 4. Lumber percentages shown in Figures 3 to 10 are cumulative. The percentage of any given grade may be found from the figures by subtracting the percentage points at the lower boundary of the grade from the percentage points at the upper boundary.



Douglas firs in Wallowa County, Oregon. On left is a pin knot before removal, and, on right, the same tree with pin knot removed. Knot indicators were not difficult to see in standing trees.

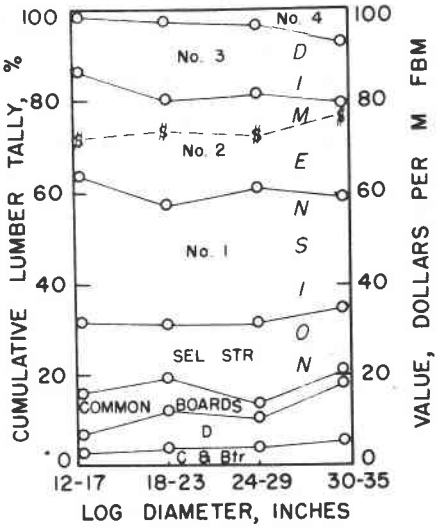
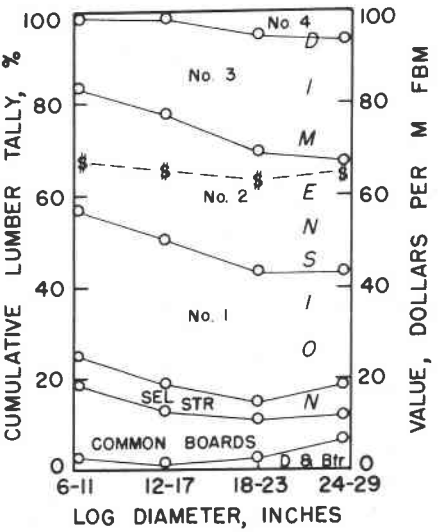


FIGURE 3. DOUGLAS FIR GRADE 3 LOGS; SURFACED-DRY LUMBER.



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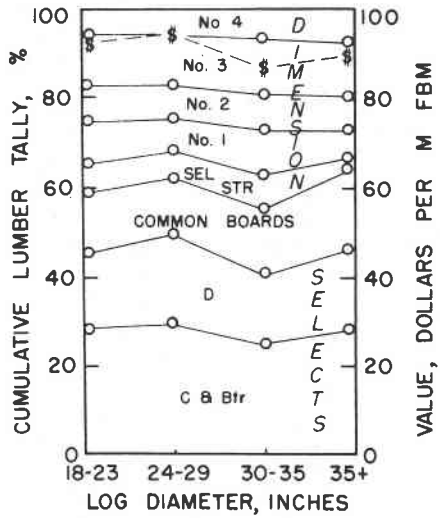


FIGURE 5. WESTERN LARCH GRADE 1 LOGS; SURFACED-DRY LUMBER.

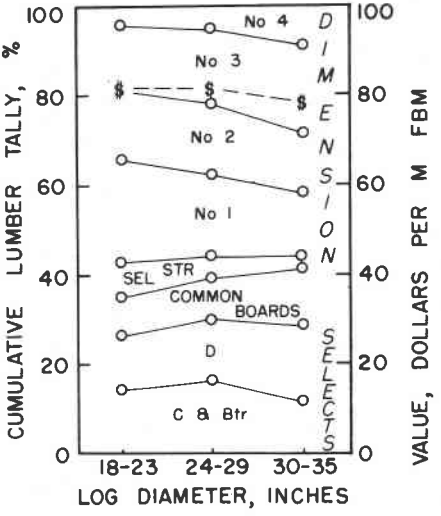


FIGURE 6. WESTERN LARCH GRADE 2 LOGS; SURFACED-DRY LUMBER.

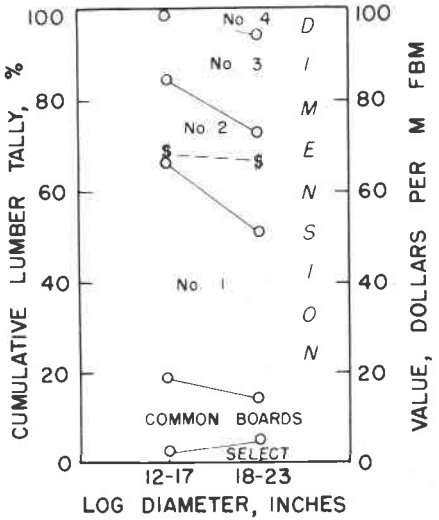


FIGURE 9. WHITE FIR GRADE 3 LOGS; SURFACED-DRY LUMBER.

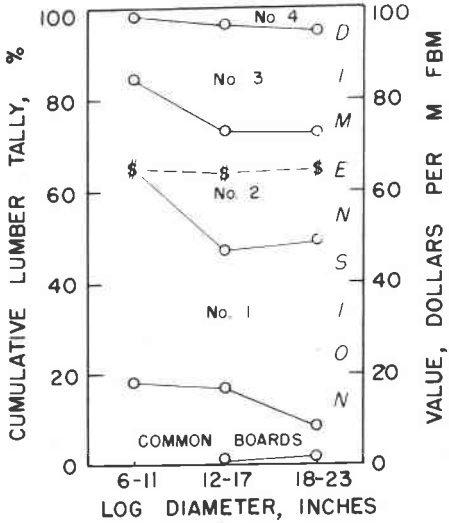


FIGURE 10. WHITE FIR GRADE 4 LOGS; SURFACED-DRY LUMBER.

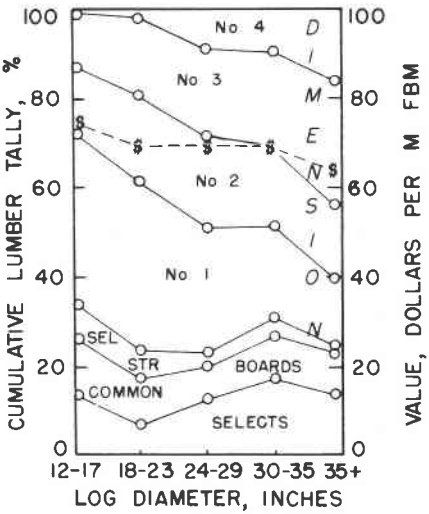


FIGURE 7. WESTERN LARCH GRADE 3 LOGS; SURFACED-DRY LUMBER.

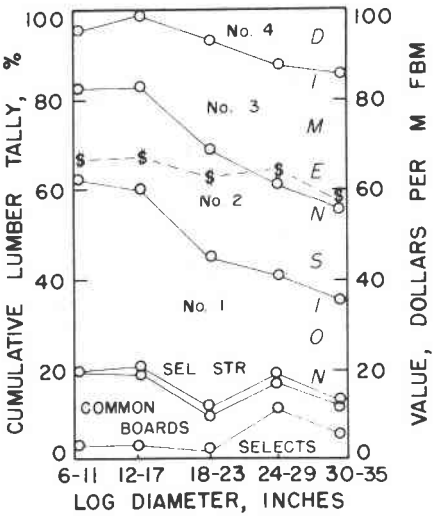


FIGURE 8. WESTERN LARCH GRADE 4 LOGS; SURFACED-DRY LUMBER.

Table 2. Douglas Fir Lumber-Grade Recovery on Basis of Surfaced-Dry Lumber-Tally Percentages for all Proposed Log Grades, at Mt. Emily Lumber Company.

Diameter class	No. logs	Lumber grades										
		Select		4/4 Common				Dimension				
		C & Btr	D	2 & Btr	3	4	5	Sel Str	1	2	3	4
Inches		%	%	%	%	%	%	%	%	%	%	%
Log grade 2												
18-23	9	11.6	11.3	0.7	1.9	2.4	0.3	13.8	22.7	17.1	14.4	3.8
Log grade 3												
12-17	12	2.7	3.5	0.6	3.8	3.6	0.3	16.6	32.7	22.4	12.2	1.6
18-23	17	3.8	8.4	0.3	2.7	3.4	0.4	12.4	26.8	21.9	17.4	2.5
24-29	10	4.0	6.3	0.1	0.9	1.9	0.6	17.6	29.7	20.3	14.8	3.8
30-35	4	5.9	12.4	0.1	0.6	1.2	0.3	14.1	24.2	20.4	16.9	3.9
Log grade 4												
6-11	16	0.7	2.4	1.5	6.8	7.1	0.6	6.6	32.0	25.9	15.4	1.0
12-17	20	0.1	1.4	1.0	4.5	5.4	0.7	5.5	31.9	27.2	20.7	1.6
18-23	14	0.4	2.0	0.4	2.8	4.7	1.0	3.6	28.8	25.9	25.0	5.4
24-29	15	1.3	5.4	0.2	1.3	2.9	1.0	7.4	24.4	23.4	26.5	6.2

Table 3. White Fir Lumber-Grade Recovery on Basis of Surfaced-Dry Lumber-Tally Percentages for all Proposed Log Grades, at Mt. Emily Lumber Company.

Diameter class	No. logs	Lumber grades										
		Select		4/4 Common				Dimension				
		C & Btr	D	2 & Btr	3	4	5	Sel Str	1	2	3	4
Inches		%	%	%	%	%	%	%	%	%	%	%
Log grade 3												
12-17	26	0.2	2.2	1.4	7.6	6.4	0.6	8.9	37.0	20.2	14.2	1.3
18-23	29	0.9	4.6	0.5	3.9	3.9	0.6	3.4	33.7	20.8	21.8	5.9
Log grade 4												
6-11	17	---	---	1.8	6.9	7.8	1.9	3.2	44.1	18.8	14.1	1.4
12-17	15	---	0.5	1.0	6.6	8.3	1.0	2.0	28.4	25.8	22.7	3.7
18-23	8	1.0	0.8	0.3	2.7	3.7	0.4	2.7	37.6	23.7	22.3	4.8

Table 4. Larch Lumber-Grade Recoveries on Basis of Surfaced-Dry Lumber-Tally Percentages for all Proposed Log Grades, at Mt. Emily Lumber Company

Diameter class	No. logs	Lumber grades										
		Select		4/4 Common				Dimension				
		C & Btr	D	2 & Btr	3	4	5	Sel Str	1	2	3	4
Inches		%	%	%	%	%	%	%	%	%	%	%
Log grade 1												
18-23	13	28.2	17.0	0.5	5.2	6.1	1.0	6.8	9.7	8.5	11.8	5.2
24-29	12	30.2	20.1	0.4	4.5	5.9	1.3	6.0	7.5	7.4	10.7	6.0
30-35	11	25.2	14.8	0.4	5.3	7.5	2.3	7.1	9.9	8.0	12.5	7.0
over 35	4	28.7	17.5	0.4	5.1	7.8	3.9	2.8	6.4	7.7	12.2	7.5
Log grade 2												
18-23	14	14.4	12.1	0.6	4.1	4.5	1.0	7.7	22.2	15.2	14.2	4.0
24-29	12	16.5	13.9	0.4	2.6	5.3	1.3	4.9	18.2	15.5	16.5	4.9
30-35	9	17.8	12.6	0.3	3.6	5.5	1.9	2.3	14.5	13.6	19.3	8.6
Log grade 3												
12-17	12	6.6	7.0	1.4	6.6	5.9	1.1	7.9	36.6	15.1	11.0	0.8
18-23	13	2.4	4.1	0.8	4.5	4.3	0.7	6.6	36.2	21.7	16.8	1.9
24-29	8	6.2	6.8	0.2	2.0	3.6	1.1	3.1	27.9	20.3	21.8	7.0
30-35	8	8.7	8.7	0.2	2.9	4.9	2.3	3.9	19.8	17.6	21.1	9.9
over 35	4	7.6	6.6	0.2	1.9	4.2	2.2	1.3	15.0	16.3	28.3	16.4
Log grade 4												
6-11	10	1.1	1.7	1.7	7.6	6.2	1.1	0.1	42.9	20.4	14.5	2.7
12-17	15	0.7	2.1	1.2	7.4	6.7	1.1	1.6	39.2	22.9	16.0	1.1
18-23	10	0.5	1.3	0.1	2.5	4.3	1.1	1.8	33.4	24.0	24.2	6.8
24-29	11	6.0	5.1	0.1	1.7	3.0	1.2	2.2	21.6	20.3	26.4	12.4
30-35	4	2.2	2.7	---	2.0	4.7	2.2	0.9	20.1	20.7	29.7	14.8

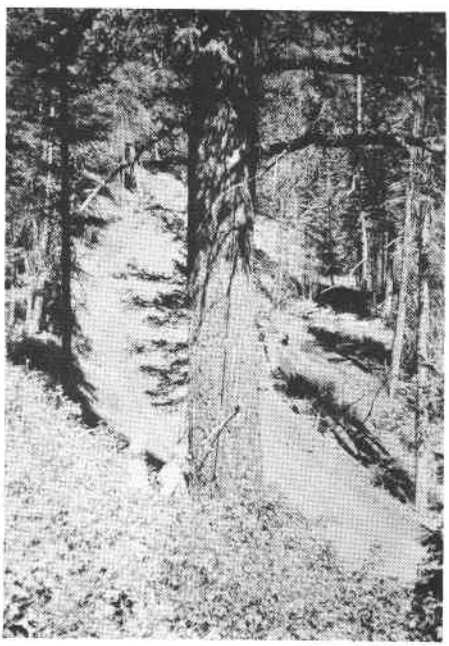
Table 5. Log Volume and Recovery of Surfaced-Dry Lumber by Species and Trial Log Grades, at Mt. Emily Lumber Company.

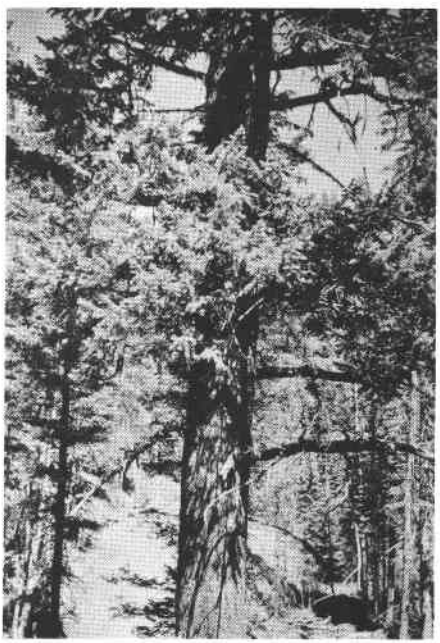
Log grade	Log volume		Lumber tally		Grade recovery										
					Select		4/4 Common				Dimension				
	Gross	Net	Green	Dry	C & Btr	D	2 & Btr	3	4	5	Sel Str	1	2	3	4
					%	%	%	%	%	%	%	%	%	%	%
Douglas fir															
2	2,560	1,990	2,518	2,368	11.6	11.3	0.7	1.9	2.4	0.3	13.8	22.7	17.1	14.4	3.8
3	14,250	12,360	15,559	14,707	4.2	8.1	0.2	1.7	2.4	0.4	15.1	27.9	21.0	15.8	3.2
4	14,300	12,960	17,392	16,138	0.8	3.5	0.5	2.7	4.2	0.9	6.0	27.6	25.0	42.1	4.7
Western larch															
1	21,000	15,850	18,144	15,771	28.0	17.3	0.4	5.0	6.8	2.1	5.8	8.5	7.9	11.8	6.4
2	16,020	13,230	15,620	13,933	16.4	12.9	0.4	3.4	5.2	1.4	4.8	18.0	14.8	16.8	5.9
3	19,050	15,820	19,939	17,549	6.3	6.7	0.5	3.4	4.5	1.6	4.4	26.3	18.4	20.3	7.6
4	12,690	10,790	14,157	12,354	2.8	3.1	0.4	3.4	4.5	1.3	1.6	28.6	21.7	23.8	8.8
White fir															
3	10,900	9,210	12,538	11,805	0.7	3.8	0.8	5.2	4.7	0.6	5.3	34.7	20.6	19.2	4.4
4	4,310	3,890	5,828	5,500	0.4	0.5	0.8	5.0	6.3	0.9	2.5	35.6	23.5	20.8	3.7

Differences in grade distribution of lumber recovered from logs of different grade are readily apparent for western larch logs in Figures 5, 6, 7, and 8. Such differences are not so evident for Douglas fir logs in Figures 3 and 4, and hardly at all evident for white fir logs in Figures 9 and 10. This lack of difference in value for the various log grades in Douglas fir and white fir may be only a local phenomenon. If studies in other areas of the Ponderosa Pine Region demonstrate similar findings, however, it may be unnecessary to grade logs of one or the other, and possibly both, of these species.

Effect of diameter class on lumber-grade distribution may be seen from Figures 3 to 10 and Tables 2, 3, and 4. The percentage of low-grade lumber did not increase with increasing log diameters.

Lumber-grade distribution for each species by log grade, regardless of diameter, is summarized in Table 5. In addition, this table permits comparison of gross log scale, net log scale, and final lumber tally for each log grade.





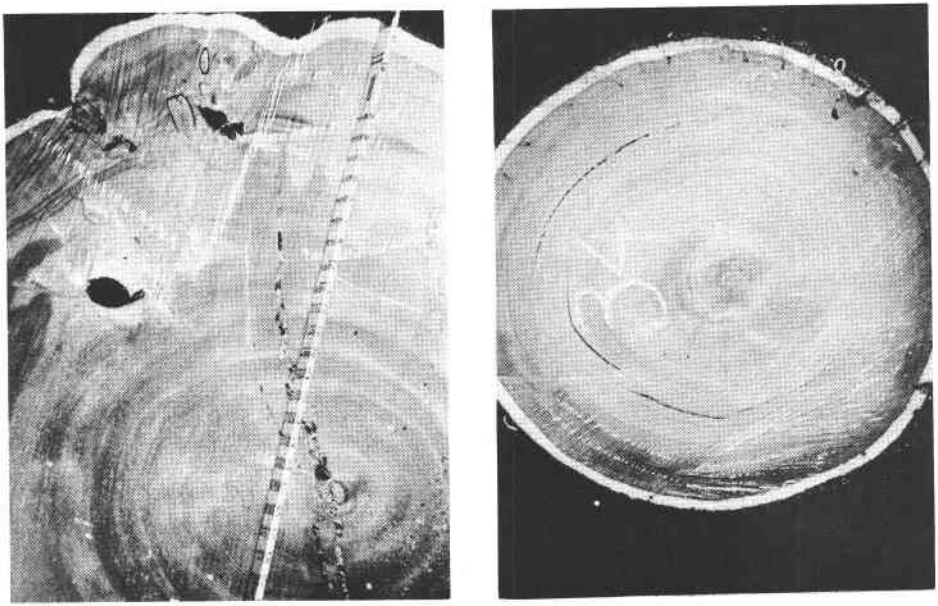
A Douglas fir in Wallowa County, Oregon. The first log is shown on the left, and the second log on the right. Note large limbs on second log.

Lumber values by log grade and diameter class

To provide increased usefulness as an index of log value, the lumber-recovery data presented in Tables 2 to 5 were converted to surfaced-dry lumber values and summarized in Table 6. It is particularly evident in the tables that lumber values for western larch increased with log grade, as should be true if the trial log grades are a useful measure of log quality.

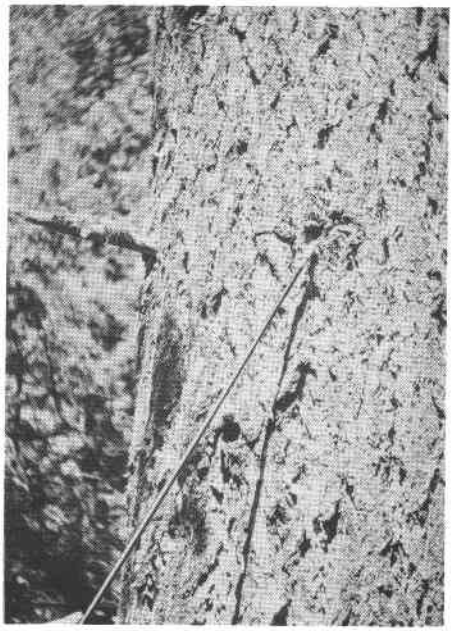
Applicability of the trial log grades

Lumber values summarized in Table 6 indicate the trial log grades provided an index of value for logs in all species except white fir. There were, however, too few Douglas fir logs in grades 1 and 2 to draw definite conclusions. It may be necessary, therefore, to apply the trial log grades to Douglas fir with caution--taking into account the difference in depth of clear wood in different timber stands. To illustrate the necessity for caution, note there were only 9 Douglas fir logs in grade 2. Wide variation in individual logs make results from such a small group unreliable.



Western larch with knot cluster (left) and shake (right) at Mt. Emily Lumber Company.

Since little difference in the value of lumber from white fir logs of grade 3 and grade 4 is shown in Table 6, there appeared no advantage in attempting to differentiate between grades 3 and 4 in this species in eastern Oregon. Study of other areas is needed to reveal relationships throughout the Ponderosa Pine Region.



Knot indicators in Douglas fir.

Table 6. Average Surfaced-Dry Lumber Value* for Each Thousand Board Feet Lumber Tally, by Species, Diameter Class, and Trial Log Grades, at Mt. Emily Lumber Company.

Diameter class	Log grade			
	1	2	3	4
Inches	M Fbm	M Fbm	M Fbm	M Fbm
Douglas fir				
6-11	--	--	--	67.87
12-17	--		71.58	65.71
18-23	--	79.86	72.62	63.34
24-29	--	--	72.14	65.33
30-35	--	--	76.55	--
All diameters**	--	79.86	73.27	65.07
Western larch				
6-11	--	--	--	66.93
12-17	--	--	74.66	67.18
18-23	92.11	80.89	69.36	62.44
24-29	94.44	81.99	69.79	64.93
30-35	86.54	79.44	70.15	58.56
over 35	89.82	--	63.93	--
All diameters**	90.69	80.80	69.40	63.87
White fir				
6-11	--	--	--	65.59
12-17	--	--	67.66	63.79
18-23	--	--	66.66	64.96
24-29	--	--	--	--
All diameters**	--	--	67.00	64.65

*Values based on Western Pine Association 1953 yearly price summary, Table 7.

**Computed from total footage and total value of each log grade.

Table 7. Prices for Calculating Log Values in Dollars for Each Thousand Board Feet of Lumber.

Taken from the Western Pine Association Annual Price Summary for 1953

One-inch thickness

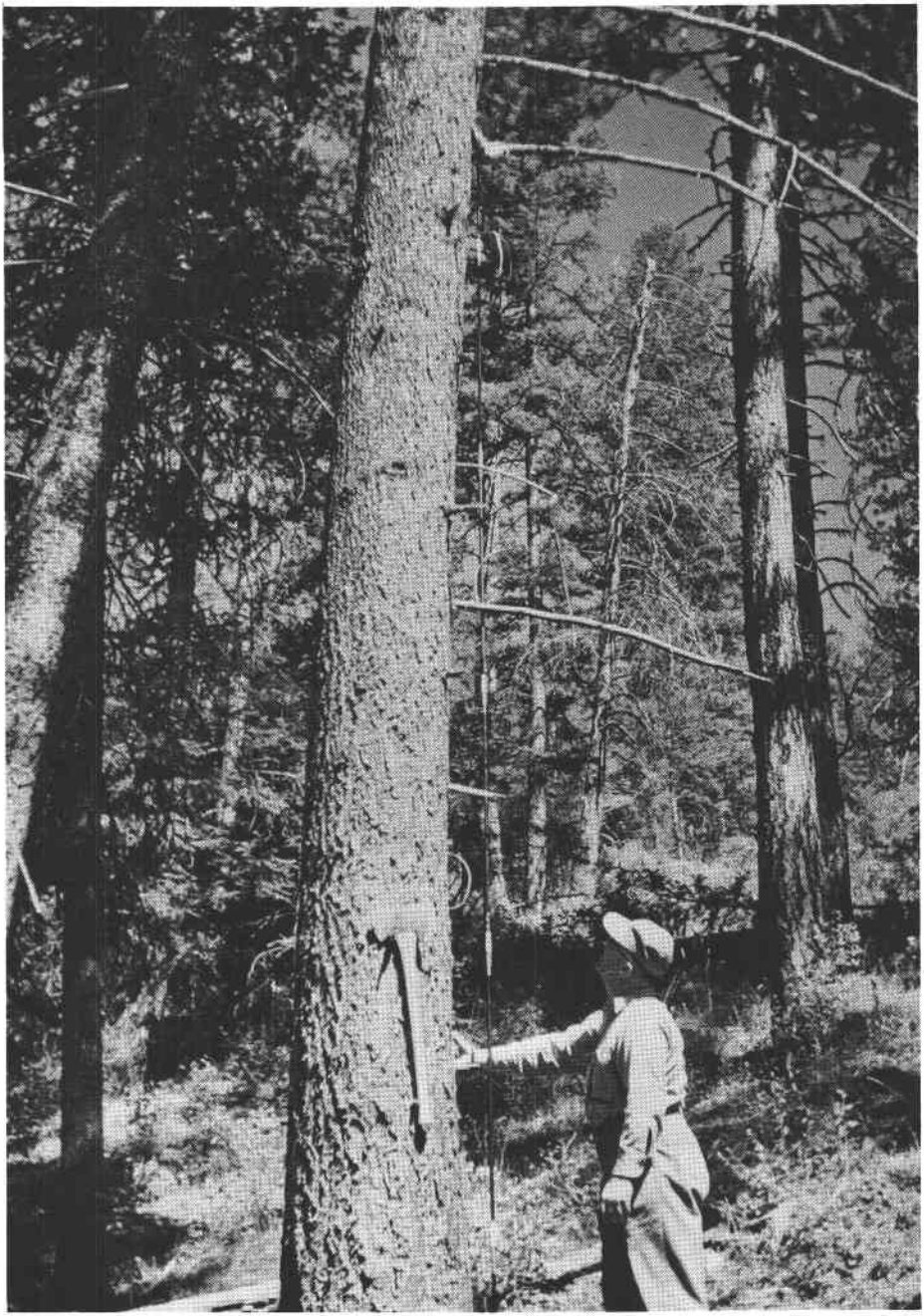
Species	Lumber grades					
	C & Btr	D	No. 2 Com	No. 3 Com	No. 4 Com	No. 5 Com
Douglas fir	138.86	113.07	79.21	67.34	55.43	30.85
Western larch	138.86	113.07	79.21	67.34	55.43	30.85
White fir	155.97	129.29	72.56	70.79	59.78	35.42

Two-inch thickness

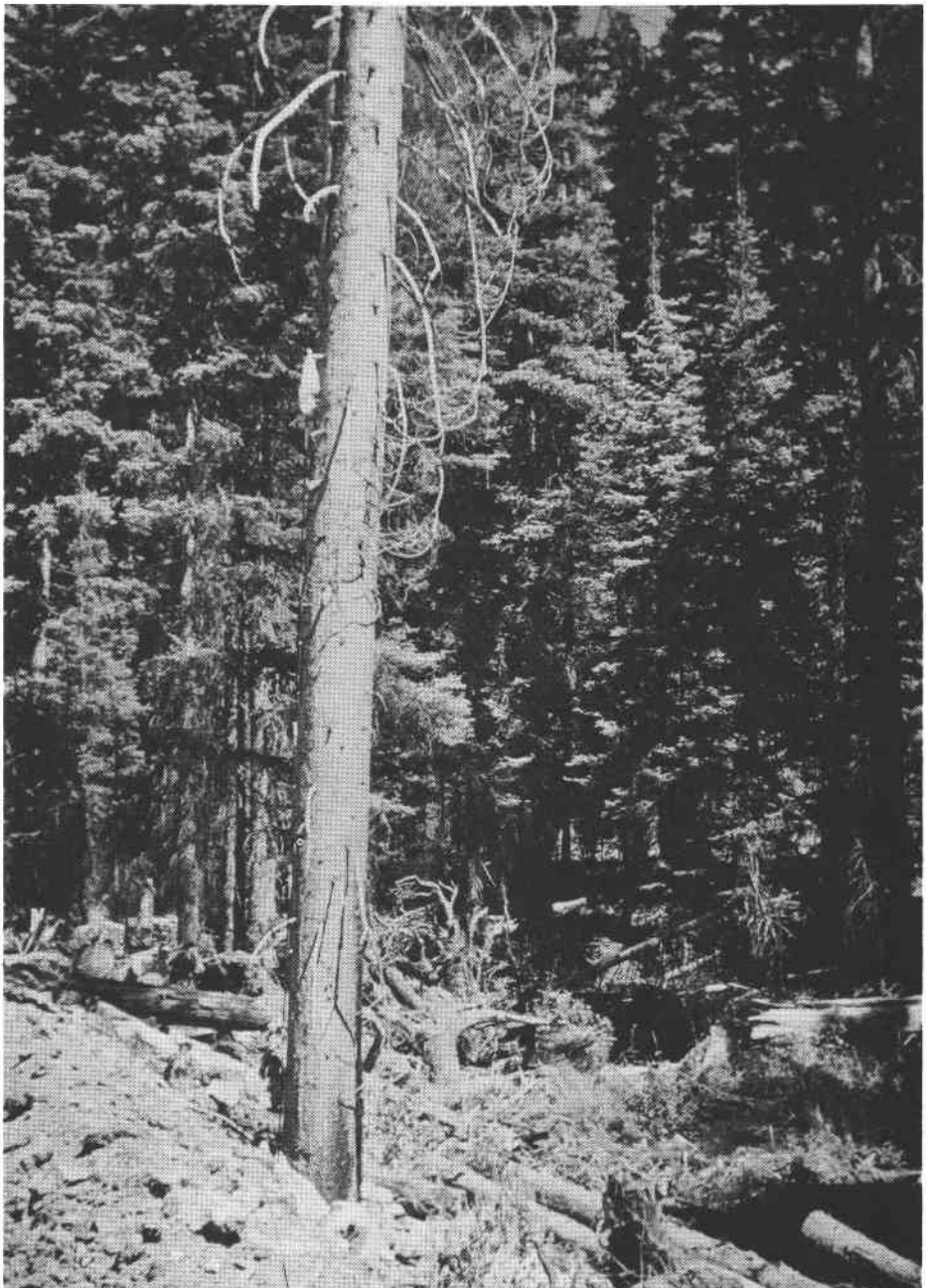
Species	Lumber grades				
	C & Btr *	D*	No.2 Dim. & Btr**	No. 3 Dim.**	No. 4 Dim.**
Douglas fir	143.72	124.41	72.02	48.05	22.17
Western larch	143.72	124.41	72.02	48.05	22.17
White fir	147.85	127.04	69.60	54.13	28.54

* Seven-quarter thickness.

** Eight-quarter thickness.



Douglas fir typical in Wallowa County, Oregon. Note dead limbs on the first log.



White fir typical in Wallowa County, Oregon. Flag indicates top of first 16-foot log.

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